

THE FIRST FOSSIL OF A PLEASING LACEWING  
(NEUROPTERA: DILARIDAE)

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*Abstract.*—The first fossil pleasing lacewing (Dilaridae) is described and figured from a single male preserved in Eocene Baltic amber. The individual represents a new genus and species of Dilarinae, *Cascadilar eocenicus*. The genus can be distinguished from other members of the Dilarinae most notably by the double pectination of the third antennal segment, the relatively well-developed mouthparts, the absence of nygmata, and the slightly narrower hind wing relative to the forewing.

*Key Words:* Baltic amber, *Cascadilar*, Dilarinae, Eocene, paleontology, Planipennia

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The pleasing lacewings comprise a small family (Dilaridae) of uncommon neuropterous insects with 67 described species distributed in Asia (Nakahara 1963, Hynd 1992), Africa (Minter 1986), Europe (Aspöck et al. 1980), and the Americas (Adams 1970, Penny 1981, 1994). The family can be readily recognized by the pectinate antennae of males, the exerted ovipositor of females, and the presence of three prominent tubercles on the vertex (Aspöck et al. 1980, New 1989, Oswald 1998). Species of the family are typically quite small (forewing lengths range from 3–22 mm) and frequently occur around dead wood where it is believed they oviposit in the crevices of, or just under the surface of, bark. The Dilaridae has been placed as the sister group to a Mantispidae + Berothidae + Rhachiberothidae clade based on the shared presence of a relatively flat larval head and the band-like, broadly inserting cardo+stipes (Aspöck 1992). The family was hypothesized by Schlüter (1986) to have arisen in the Upper Jurassic, even in the absence of any dilarid fossils. This age was based on the

presumed phylogenetic affinity of the family with the Mantispidae and Berothidae (at that time inclusive of the Rhachiberothidae), the latter of which was represented among the Lower Cretaceous fauna by two genera (Whalley 1980). By any account, the geological range of the Dilaridae can now be extended back to the Middle Eocene on the basis of the fossil reported herein.

The neuropteroid fauna of the Baltic amber has been investigated by a number of authors—Megaloptera (Pictet 1854, Weidner 1958, Wichard 1997), Raphidioptera (Carpenter 1956, Engel 1995, Hagen 1854), Planipennia (Hagen 1854, Keilbach 1982, Krüger 1923, MacLeod 1970, Meinander 1972, 1975, Parfin and Gurney 1956, Pictet and Hagen 1856). This is presently the best known amber for Neuropteroidea with only a few specimens reported from British, Dominican, French, Lebanese, and Mexican ambers.

The few measurements presented in the descriptions are approximate since the optimal angle for taking a given measure was difficult due to the surface of the amber.



Fig. 1. Photomicrograph of male holotype of *Cascadilar eocenicus*.

#### SYSTEMATIC PALEONTOLOGY

#### *Cascadilar* Engel, new genus

Type species.—*Cascadilar eocenicus* Engel, new species.

Description.—Vertex with three prominent tubercles, covered with minute setae. Antenna pectinate (Figs. 1–2); elongate lateral processes on distal halves of antennal segments three through eight; antennal segment three with two lateral processes, basal process short, distal process elongate; basal two segments and distal four segments without lateral processes (Fig. 2). Short scythe-like mandibles protruding from face; maxillary palpus extending just beyond apices of mandibles, apparently five-segmented (difficult to see all segments); labial palpus minute, not reaching beyond borders of

head in any direction (number of segments indeterminate from the fossil). Wings strongly pubescent; MA fusing in forewing with radial system near wing base, separating from radial system well before separation of R1 and Rs (Fig. 3); nygmata absent; trichosors well-developed, shorter along anterior wing margin and absent basally on anterior margin; hind wing slightly narrower than forewing.

Etymology.—The generic name is a combination of the Latin word *cascus* (meaning “old”) and *Dilar* (type genus of the family). The gender is masculine.

Comments.—*Cascadilar* is a member of the subfamily Dilarinae as evidenced by the branching of MA prior to the separation of R1 and Rs in the forewing and by the pos-

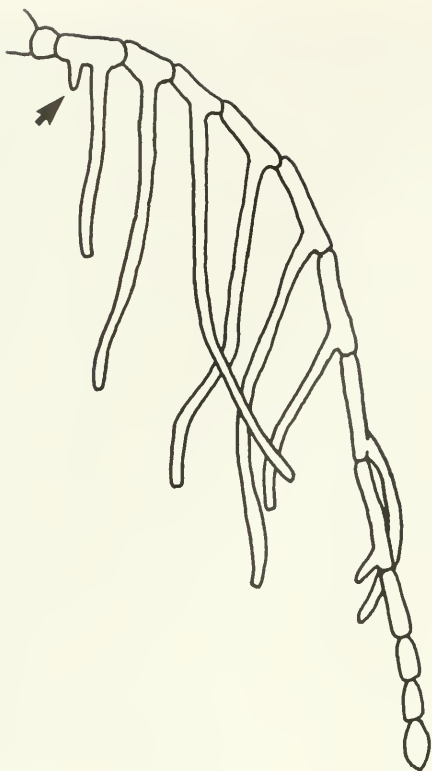


Fig. 2. Right male antenna of *Cascadilar eocenicus*, as preserved. Arrow indicates short basal process of antennal segment three.

session of more than three distal antennomeres without lateral processes. It can be most notably distinguished from other dipterine genera by the presence of two lateral processes on the third antennomere, the relatively well-developed mouthparts (a primitive feature among the family), and the absence of nygmata in the forewing.

***Cascadilar eocenicus* Engel, new species**  
(Figs. 1–3)

Diagnosis.—As for the genus.

Description.—*Male*: Total body length 2 mm (excluding antennae). Forewing length 3.7 mm. Hind wing length 3.4 mm. Head transverse, wider than long. Antenna 14-segmented; long, extending posteriorly approximately three-quarters of distance to abdominal apex; scape roughly quadrate; distal, non-pectinate segments progressive-

ly shorter than segments with lateral processes; distal-most segment pointed at apex (Fig. 2). Eyes large, spherical. Pubescence of head exceedingly sparse and short. Integument of head apparently brown, slightly darker on vertex surrounding tubercles.

Pronotum slightly wider than long, with scattered fuscous pubescence; pubescence sparse except laterally where it is longest and relatively numerous; remainder of thorax with almost no pubescence; thorax brown. Legs slender, with scattered minute, silvery setae; tibial spurs absent; tarsi five-segmented; first segment about as long as combined lengths of second, third, and fourth segments; second segment about as long as fifth; third and fourth segments progressively shorter than second segment; claws minute. Forewing relatively broad, densely pubescent, particularly between Sc and anterior margin and on basal third; 13 crossveins in costal margin; no sc crossveins; three crossveins between R1 and Rs; Rs five-branched; other details of forewing venation depicted in Fig. 3. Wing membrane hyaline, without fuscous patterning; veins amber; pubescence slightly fuscous.

Abdomen apparently without pubescence, integument shining and appearing faintly imbricate; apparently uniformly brown. Most of terminalia not visible in fossil except eighth and ninth terga appear unmodified without emargination or processes along borders; ectoproct with long, fuscous setae, progressively becoming shorter towards apex; apex dark brown and conspicuous.

*Female*: Unknown.

Holotype.—Male, Eocene Baltic amber, deposited in the California Academy of Sciences (formerly in P. Craig collection), San Francisco. The specimen bears three labels which read as follows: Baltic Amber, Pat Craig Collection, February 1996/Holotype, *Cascadilar eocenicus* Engel, desig. M. S. Engel/Baltic amber, Diptera, Mycetophilidae, fungus gnat (2).

Preservation.—The specimen is wonderfully preserved lacking the mold found on

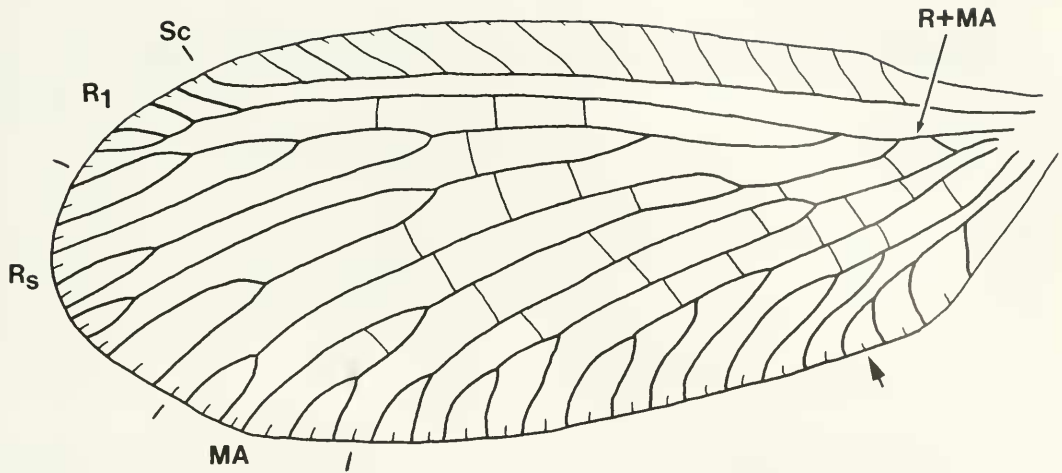


Fig. 3. Left forewing venation of *Cascadilar eocenicus* with major vein systems discussed in the text indicated. Large arrow indicates one of the trichosors present along the posterior margin. Wing hairs omitted.

many Baltic amber inclusions. Two mycetophilid flies (Fig. 1) unfortunately obscure some portions of the lacewing.

**Etymology.**—The specific epithet is derived from the epoch name, Eocene.

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